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Acid Pretreatment of Sago Wastewater for Biohydrogen Production

(Conference Paper)

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Abstract

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Biohydrogen has been recognized to be one of the future renewable energy sources and has the potential in solving the greenhouse effects. In this study, Enterobacter aerogenes (E. aerogenes) was used as the biohydrogen producer via dark fermentation process using sago wastewater as the substrate. However, pretreatment of sago wastewater is required since it consists of complex sugars that cannot be utilized directly by the bacteria. This study aimed to use acid pretreatment method to produce high amount of glucose from sago wastewater. Three different types of acid: sulfuric acid (H_2SO_4); hydrochloric acid (HCl) and nitric acid (HNO_3) were screened for the best acid in producing a maximum amount of glucose. H_2SO_4 gave the highest amount of glucose which was 9.406 g/L. Design of experiment was done using Face-centred Central Composite Design (FCCCD) tool under Response Surface Methodology (RSM) in Design Expert 9 software. The maximum glucose (9.138 g/L) was recorded using 1 M H_2SO_4 at 100 °C for 60 min. A batch dark fermentation using E. aerogenes was carried out and it was found that pretreated sago wastewater gave a higher hydrogen concentration (1700 ppm) compared to the raw wastewater (410 ppm). © The Authors, published by EDP Sciences, 2018.

Indexed keywords

Engineering controlled terms: Chlorine compounds, Design of experiments, Environmental engineering, Fermentation, Glucose, Hydrogen production, Renewable energy resources, Starch

Compendex keywords: Acid pretreatment, Bio-hydrogen production, Dark fermentation, Enterobacter aerogenes, Face centred central composite design, Hydrogen concentration, Renewable energy source, Response surface methodology

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